



Howard Olson, Superintendent

CARRINGTON IRRIGATION BRANCH STATION

The Carrington Irrigation Station is located near the western edge of the drift prairie which cuts a 20,000,000 acre swath from north to south through North Dakota. It is small grain country with a mixture of other crops, some livestock and the area proposed for the development of 250,000 acres for irrigation. The latter would be concentrated in the shallow glacial lake bottoms of the Souris in north central, Dacotah in south central and alluvial outwash in the New Rockford, Warwick and McVile areas. These areas have soils that are inclined to be sandy with a low water holding capacity. Hence, crop production on these soils is most vulnerable to the effects of drought which could be alleviated with development

of supplemental irrigation.

Currently, the Garrison project is temporarily stymied by environmental concerns, court action and administrative decision. But, private development of irrigation continues where suitable land, adequate water, financial resources and management ability occur. In the last two years, the irrigated acreage in North Dakota has increased over 50% according to NDSU Cooperative Extension Service surveys. Interest in irrigation agriculture has likewise increased.

The identity of the Carrington location as an irrigation station is in part a misnomer as an approximate equal effort is dedicated to research in dryland agricul-

ture. Dryland agriculture will always be dominant in the Carrington area as well as in the whole state. Of the 25,000,000 acres of tillable land in North Dakota, it has been estimated that water resources available to soils suitable for irrigation could allow development of approximately 2,500,000 acres. This 10 to 1 relationship between dryland and potentially irrigable acreage must be kept in mind when concerns are expressed regarding potential irrigation, environmental factors and all other facets of land and water resource development. The importance of dryland agriculture should not be overlooked in planning, building and developing facilities for irrigated agriculture for the reason that it is now and will continue to be the backbone of the State's agriculture.

The program at Carrington can be divided into four major areas that include:

- a) Irrigated and dryland crop production experiments
- b) Beef production utilizing irrigated forages
- c) On-farm irrigation mechanics and engineering
- d) Tours, demonstrations, visitors, workshops, a program of show-n-tell

During the comparatively short history of the station there have been a number of accomplishments that are believed to have made a contribution to the knowledge and well-being of the people in this area of the state.

Prior to the establishment of the Carrington station crop variety yield information was extrapolated from Minot, Langdon or Fargo, each a distance of some 120 miles from the Carrington location in east central North Dakota. Having production information on the performance of many varieties of the traditional crops grown in the area has been a real asset to the farmer in selecting for production those varieties with greatest yield potential and marketable quality characteristics.

Under irrigation, crop production experiments have identified those crops and crop varieties with the greatest production potential. Generally, the long growing season crops have demonstrated the greatest response to supplemental irrigation. Corn, alfalfa, potatoes, sugarbeets and edible beans all have yielded at levels 2 to 2½ times dryland production. The irrigated crop variety yield trials of a number of crops have been most helpful in identifying those new varieties with highest yield potentials. This information is very useful to the plant breeder evaluating performance of experimental materials in the nursery plantings. So often plantings in dryland experiments suffer from a moisture deficit at some time in the life cycle of the plant that limits production and thus masks its yield potential. Irrigated plantings overcome this deficiency.

Forage crops grow abundantly and consistently produce good yields under irrigation, but their bulk limit transportation and necessitate utilization by livestock at or near the point of production. To measure beef production in terms of pounds of beef per acre a beef cow-calf project was added to the Carrington Station in 1972. A grant of \$109,000 from the Garrison Conservancy District made possible the construction of needed facilities.

Five years of comparative beef production data from irrigated pasture and drylot confinement were summarized and published in the July-August issue of *Farm Research*. Significant findings included data showing cows with calves maintained in drylot produced nearly twice as much beef per irrigated acre as those on irrigated pasture; steers can be finished to choice market grade at 20 to 22 months of age on rations of just corn silage and alfalfa hay; feed additives and implants increased feed efficiencies 20% on high roughage diets for growing young animals. Of particular significance was measuring production of approximately 1000 lbs. of beef per acre from average yields of corn silage and alfalfa hay harvested and fed to young beef animals in drylot.

Increased farm labor costs have changed irrigation methods markedly in the last 20 years. The advent of the center-pivot sprinkler not only minimized labor, but also expanded the acreage that can be irrigated with a given quantity of water as compared to traditional surface or gravity methods. Further, by eliminating the need for land leveling required for surface irrigation it nullified the topographic limitation of arable soils otherwise classified as suitable for irrigation. One of the first center-pivot irrigation systems in the state was installed at the Carrington Station. The acceptance of this method of irrigation by farmers in organized irrigation districts had a major influence on the re-design of the Garrison Project works to accommodate sprinkler rather than surface irrigation systems as originally planned.

Since the original center-pivot sprinkler installation in 1965 three additional systems have been installed. All are from different manufacturers and are somewhat different in design to allow for comparative performance and the accumulation of information useful to farmers buying irrigation equipment.

Buried pipelines for the conveyance of irrigation water can replace open irrigation ditches. In adapting pipelines to North Dakota soil and climate conditions a major concern was the durability of various pipe materials buried within the frost zone. The cost of buried lines placed below frost would be prohibitive. To evaluate the performance of pipe fabricated from various materials installations were made at Carrington Station for operating the several irrigation systems. Over 15,000 feet of pipe were installed within the frost zone. After 10 years of use none of the pipe has failed as a result of frost action. This experience has encouraged Reclamation engineers to design and use shallow buried pipe instead of open ditches in much of the Garrison project distribution system.

The Carrington Irrigation Station serves as an information center for all interested irrigators in the state and the adjacent dryland farming community. Tours, workshops and other public information activities have been conducted to acquaint the public with irrigation farming. Irrigation is a relatively new and different kind of farming in our state. People are interested in its mechanics, its economics and its potential for both individual and project development. A determined effort has been made to inform both the individual and the agencies involved with water resource development for irrigation.